

WHAT IS CLAIMED IS:

1           1. An electronic device comprising:  
2               a plurality of external terminals each having a  
3 base member and a metal thin film formed in direct contact  
4 with a surface of the base member,  
5               the metal thin film being made of an alloy of tin  
6 and bismuth and the bismuth being contained in the alloy so  
7 as to satisfy any one of the following conditional  
8 expressions;  
9       (a)  $20 \leq X_m \leq 25$  and  $0.5 \leq C_{am} \leq 4.5$ ,  
10       (b)  $15 \leq X_m \leq 20$  and  $0.7 \leq C_{am} \leq 4.5$ ,  
11       (c)  $10 < X_m \leq 15$  and  $4.5 \leq C_{am} \leq 6.0$ ,  
12 wherein  $X_m$  indicating the thickness (MIC) of the metal thin  
13 film and  $C_{am}$  indicating wt % of the bismuth in the metal  
14 thin film.

1           2. An electronic device comprising:  
2               a plurality of external terminals each having a  
3 base member and a metal thin film formed in direct contact  
4 with a surface of the base member,  
5               the metal thin film being made of an alloy of tin  
6 and bismuth and the bismuth being contained in the alloy so  
7 as to satisfy any one of the following conditional  
8 expressions;  
9       (a)  $10 < X_m \leq 25$ ,  $0.5 \leq C_{am} \leq 6.0$  and  $-8C_{am} + 46 < X_m \leq -$   
10  $8C_{am} + 54$ ,  
11       (b)  $10 < X_m \leq 25$ ,  $0.5 \leq C_{am} \leq 6.0$  and  $-5C_{am} + 25 \leq X_m \leq -$

12  $8C_{am} + 46,$   
13 (c)  $10 < X_m \leq 25, 0.5 \leq C_{am} \leq 6.0$  and  $-5C_{am} + 15 \leq X_m < -$   
14  $5C_{am} + 25,$   
15 wherein  $X_m$  indicating the thickness (MIC) of the metal thin  
16 film and  $C_{am}$  indicating wt % of the bismuth in the metal  
17 thin film.

1 3. An electronic device comprising:  
2 a plurality of external terminals each having a  
3 base member and a metal thin film formed in direct contact  
4 with a surface of the base member,  
5 the metal thin film being made of an alloy of tin  
6 and silver and the silver being contained in the alloy so  
7 as to satisfy the following conditional expression;  
8  $15 \leq X_m \leq 25$  and  $2.0 \leq C_{am} \leq 4.0,$   
9 wherein  $X_m$  indicating the thickness (MIC) of the metal thin  
10 film and  $C_{am}$  indicating wt % of the silver in the metal  
11 thin film.

1 4. An electronic device comprising:  
2 a plurality of external terminals each having a  
3 base member and a metal thin film formed in direct contact  
4 with a surface of the base member,  
5 the metal thin film being made of an alloy of tin  
6 and zinc and the zinc being contained in the alloy so as to  
7 satisfy the following conditional expression;  
8  $15 \leq X_m \leq 30$  and  $4.0 \leq C_{am} \leq 9.0,$

9 wherein  $X_m$  indicating the thickness (MIC) of the metal thin  
10 film and  $C_{am}$  indicating wt % of the silver in the metal  
11 thin film.

1           5. The electronic device as claimed in claim 1,  
2 wherein the metal thin film is formed by plating.

1           6. The electronic device as claimed in claim 1,  
2 wherein the base member is composed of a conductive  
3 material.

1           7. The electronic device as claimed in claim 6,  
2 wherein the conductive material comprises a metal selected  
3 among the group including an iron-nickel alloy, an iron-  
4 nickel-based alloy, copper, a copper-based alloy and iron.

1           8. The electronic device as claimed in claim 2,  
2 wherein the metal thin film is formed by plating.

1           9. The electronic device as claimed in claim 2,  
2 wherein the base member is composed of a conductive  
3 material.

1           10. The electronic device as claimed in claim 9,  
2 wherein the conductive material comprises a metal selected  
3 among the group including an iron-nickel alloy, an iron-  
4 nickel-based alloy, copper, a copper-based alloy and iron.